

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A conductive member[[,]] for use in an image-forming apparatus, ~~in the group which includes a conductive roller or a conductive belt having~~ comprising a conductive layer formed of a conductive polymer composition containing an ionic-conductive addition salt,

wherein said conductive layer comprises a continuous polymer phase and at least one or more uncontinuous discontinuous polymer phases including at least one first uncontinuous discontinuous polymer phase;

said continuous polymer phase and said at least one uncontinuous discontinuous polymer phase ~~form~~ forming a sea-island structure;

~~a salt capable of dissociating into cations and anions is unevenly distributed to said first uncontinuous phase;~~

[[a]] the polymer composing said first uncontinuous discontinuous polymer phase has a higher degree of affinity for said salt ~~capable of dissociating into cations and anions~~ than [[a]] polymer composing said continuous polymer phase; [[and]]

the first discontinuous polymer phase comprising the salt and the polymer having the higher degree of affinity for said salt; and

said conductive layer has a volume resistivity not less than 10^4 (~~$\Omega\cdot\text{cm}$~~) $\Omega\cdot\text{cm}$ nor more than 10^{12} (~~$\Omega\cdot\text{cm}$~~) $\Omega\cdot\text{cm}$, when said volume resistivity is measured at a voltage of 100V applied to said conductive polymer composition in accordance with the method specified in JIS K6911.

2. (Currently Amended) The conductive member according to claim 1, wherein ~~supposing that~~ a volume resistivity of ~~said polymer composing said first uncontinuous discontinuous polymer phase to which said salt capable of dissociating into cations and anions is unevenly distributed~~ is ρv_1 and ~~that said polymer composing said continuous polymer phase is~~ ρv_2 , the following equation establishes:

$$0.2 \leq \log_{10} \rho v_2 - \log_{10} \rho v_1 \leq 5.$$

3. (Currently Amended) The conductive member according to claim 1, wherein a weight ratio of ~~a weight of said polymer composing said uncontinuous discontinuous polymer phase to a weight of said polymer composing said continuous polymer phase~~ is set to 5:95 to 75:25.

4. (Currently Amended) The conductive member according to claim 1, wherein said at least one uncontinuous discontinuous polymer phase ~~consists of comprises~~ said first uncontinuous discontinuous polymer phase and a second uncontinuous discontinuous polymer phase; and said salt ~~capable of dissociating into cations and anions is unevenly~~ is preferentially distributed to said first uncontinuous discontinuous polymer phase ~~whereas said salt capable of dissociating into cations and anions is distributed very little to said second uncontinuous discontinuous phase and said continuous phase;~~

an affinity between said salt and said polymer composing said first uncontinuous discontinuous polymer phase is higher than an affinity between said salt and said polymer composing said continuous polymer phase, and said affinity between said salt and said polymer

composing said continuous polymer phase is higher than an affinity between said salt and said polymer composing said second ~~uneontinuous~~ discontinuous polymer phase; and

[[an]] a volume resistivity electric resistance (~~volume resistivity~~) of said first ~~uneontinuous~~ discontinuous polymer phase is lower than [[an]] a volume resistivity electric resistance of said continuous polymer phase, and said electric resistance of said continuous polymer phase is lower than an electric resistance of said second ~~uneontinuous~~ discontinuous polymer phase.

5. (Currently Amended) The conductive member according to claim 1, wherein said salt ~~capable of dissociating into cations and anions has a~~ has an electric conductivity of not less than 2.3mS/cm, when said electric conductivity is measured at a concentration of a salt of 0.1 mol/liter at 25°C in a mixed solvent of propylene carbonate (~~PC~~) and dimethyl carbonate (~~DME~~) (mixing carbonate, wherein a ratio between [[PC]] propylene carbonate and [[DME]] dimethyl carbonate is 1:2 in volume fraction[[]]).

6. (Currently Amended) The conductive member according to claim 1, wherein said salt ~~capable of dissociating into cations and anions~~ is an anion-containing salt having fluoro groups and sulfonyl groups.

7. (Currently Amended) The conductive member according to claim 6, wherein said salt ~~capable of dissociating into cations and anions~~ is a lithium salt, a potassium salt, a quaternary ammonium salt or an imidazolium salt.

8. (Original) The conductive member according to claim 1, wherein said conductive polymer composition is a vulcanized or a thermoplastic elastomer composition.

9. (Currently Amended) The conductive member according to claim 1, wherein each of polymers ~~for use~~ in said continuous polymer phase and said ~~unecontinuous~~ discontinuous polymer phase has a glass transition temperature $[(T_g)]$ T_g not more than -40°C .

10. (Currently Amended) The conductive member according to claim 1, wherein said continuous polymer phase contains low nitrile acrylonitrile-butadiene rubber (~~NBR~~); said first ~~unecontinuous~~ discontinuous polymer phase contains polyether polymer; and said second ~~unecontinuous~~ discontinuous phase contains ethylene-propylene-diene copolymer (~~EPDM~~); and said salt capable of dissociating into cations and anions is unevenly preferentially distributed to said polyether polymer of said first ~~unecontinuous~~ discontinuous polymer phase.

11. (Currently Amended) The conductive member according to claim 1, wherein said continuous polymer phase contains low nitrile acrylonitrile-butadiene rubber (~~NBR~~); said first ~~unecontinuous~~ discontinuous polymer phase contains polyether polymer; and $[[\text{said}]]$ a second ~~unecontinuous~~ discontinuous polymer phase contains ethylene-propylene-diene copolymer (~~EPDM~~); and

a volume fraction of said continuous phase is higher than a volume fraction of said second ~~unecontinuous~~ discontinuous polymer phase; and said volume fraction of said second

~~uncontinuous~~ discontinuous polymer phase is higher than a volume fraction of said first ~~uncontinuous~~ discontinuous polymer phase.

12. (Currently Amended) The conductive member, according to claim 11, comprising 50 wt% to 90 wt% of said low-nitrile acrylonitrile-butadiene rubber (~~NBR~~); 10 wt% to 40 wt% of said ethylene-propylene-diene copolymer (~~EPDM~~); 0.5 wt% to 25 wt% of said polyether polymer; and 0.1 wt% to 2 wt% of said salt ~~capable of dissociating into cations and anions~~.

13. (Currently Amended) The conductive member according to claim ~~[[4]]~~ 10, wherein said polyether polymer ~~essentially contains~~ comprises a copolymer of ~~ethylene oxide (EO)-propylene oxide (PO)-allyl glycidyl ether (AGE)~~ ethylene oxide-propylene oxide-allyl glycidyl ether.

14. (Currently Amended) The conductive member according to claim 1, wherein said conductive polymer composition has a compression set not more than 30%, when said compression set is measured at a temperature of 70°C for 22 hours to 24 hours at a compression rate of 25% in accordance with ~~Permanent~~ permanent set testing methods for rubber, vulcanized or thermoplastic specified in JIS K6262.

15. (Currently Amended) The conductive member~~[[,]]~~ according to claim 1, ~~consisting of~~ wherein the conductive layer comprises a roller having said conductive layer or a belt having said conductive layer.

16. (Currently Amended) The conductive member ~~consisting of a conductive roller~~ according to claim 1, wherein the conductive member comprises a conductive roller having when an electric resistance R $[(\Omega)]$ in Ω ~~of said conductive roller~~ is measured by applying a constant voltage of 1000V thereto for 96 hours successively at a temperature of 23°C and a relative humidity of 55%, wherein $\Delta \log_{10} R = \log_{10} R(t=96 \text{ hours}) - \log_{10} R(t=0 \text{ hour})$ indicating a rise amount of said electric resistance R $[(\Omega)]$ in Ω is set to not more than 0.5.

17. (Currently Amended) The conductive member consisting of a conductive roller according to claim 1, wherein when an electric resistance R $[(\Omega)]$ in Ω of said conductive roller is measured at a temperature of 10°C and a relative humidity of 15% and at a temperature of 32.5°C and a relative humidity of 90%, wherein $\Delta \log_{10} R = \log_{10} R(\text{temperature of } 10^\circ\text{C and relative humidity of } 15\%) - \log_{10} R(\text{temperature of } 32.5^\circ\text{C and relative humidity of } 90\%)$ indicating a dependence degree of said electric resistance on environment is set to not more than 1.7.

18. (Currently Amended) The conductive member ~~consisting of a conductive roller or/and a conductive belt~~ according to claim 1, wherein said conductive layer is a conductive roller or a conductive belt formed as a cellular material layer having an expansion ratio of not less than 100% nor more than 500% and a hardness of not more than 60 degrees, when said hardness is measured by the durometer of type E specified in JIS K6253.

19. (Currently Amended) The conductive member ~~consisting of a conductive belt~~ according to ~~any one of~~ claim 1, wherein ~~when~~ the conductive member is a conductive belt having a volume resistivity ρ_v (~~$\Omega\cdot\text{cm}$~~) in $\Omega\cdot\text{cm}$ of a sample of said conductive belt that is measured by applying a constant voltage of 1000V to said sample having a thickness of 0.25mm for five hours successively at a temperature of 23°C and a relative humidity of 55%, $\Delta\log_{10}\rho_v = \log_{10}\rho_v(t=5 \text{ hours}) - \log_{10}\rho_v(t=0 \text{ hour})$ indicating a rise amount of said volume resistivity is set to not more than 0.5.

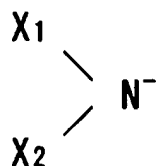
20. (Currently Amended) The conductive member ~~consisting of a conductive belt~~ according to claim 1, wherein ~~when~~ the conductive member is a conductive belt having a volume resistivity ρ_v (~~$\Omega\cdot\text{cm}$~~) in $\Omega\cdot\text{cm}$ of said conductive belt is measured at a temperature of 10°C and a relative humidity of 15% and at a temperature of 32.5°C and a relative humidity of 90%, $\Delta\log_{10}\rho_v = \log_{10}\rho_v(\text{temperature of } 10^\circ\text{C and relative humidity of } 15\%) - \log_{10}\rho_v(\text{temperature of } 32.5^\circ\text{C and relative humidity of } 90\%)$ indicating a dependence degree of said volume resistivity on environment is set to not more than 1.7.

21. (Currently Amended) The conductive member ~~consisting of a flame retardant seamless belt~~ according to claim 1, wherein the conductive member is a flame retardant seamless belt having said conductive polymer composition that comprises 50 to 95 parts by weight of a polyester thermoplastic elastomer added to 100 parts by weight of an entire polymer component; 15 wt% to 40 wt% of melamine cyanurate serving as a flame-retardant additive added to 100 wt% of said conductive polymer composition; 0.01 parts by weight to 3 parts by weight of said

salt, which can dissociate into cations and at least an anion shown by a chemical formula 1, added to 100 parts by weight of said entire polymer component; and not less than 5 parts by weight nor more than 50 parts by weight of a copolymer, having a polyether block, added to 100 parts by weight of said polyester thermoplastic elastomer; and

said conductive polymer composition has a volume resistivity of not less than $1.0 \times 10^6 \Omega \cdot \text{cm}$ nor more than $1.0 \times 10^{12} \Omega \cdot \text{cm}$ [[.]]

Chemical Formula 1



~~Where~~ where X_1 and X_2 denote functional group which contains C, F-, and $-\text{SO}_2-$ and in which the number of carbon atoms is one to eight.

22. (Currently Amended) The conductive member ~~consisting of a belt~~ according to claim 21, wherein ~~supposing that~~ a volume resistivity of said belt measured immediately after a constant voltage of 1000V is applied to a sample of said belt having a thickness of $250 \mu\text{m}$ at a temperature of 23°C and a relative humidity of 55% is ρ_v (~~$t=0$ hour~~) at $t=0$ hour and that a volume resistivity measured after said voltage is applied to said sample for five hours successively is ρ_v (~~$t=5$ hours~~) at $t=5$ hours, the following relationship establishes:

$$\log_{10}\rho_v(t=5 \text{ hours}) - \log_{10}\rho_v(t=0 \text{ hour}) \leq 0.5$$

23. (Currently Amended) The conductive member according to claim 21, wherein a glass transition temperature T_g of said copolymer having said polyether block is set to not more than -40°C ; and

a weight of said copolymer, having said polyether block, contained in a material of said belt is 1.6 to 3333 times as large as that of said salt, which can dissociate into cations and at least an anion shown by said chemical formula 1.

24. (Currently Amended) The conductive member according to claim 21, wherein said X_1^- of said chemical formula 1 is $C_{n1}H_{m1}F_{(2n1-m1+1)}-SO_2^-$, and X_2^- of said chemical formula 1 is $C_{n2}H_{m2}F_{(2n2-m2+1)}-SO_2^-$ [[()] where n_1 and n_2 are integers not less than 1, and m_1 and m_2 are integers not less than 0 $[[()]]$; and

a cation making a pair with said anion, shown by said chemical formula 1, which constitutes said salt is a cation of any one of alkali metals including lithium, group 2A metals, and transition metals, and amphoteric metals.

25. (Original) The conductive member according to claim 21, wherein when a volume resistivity of said conductive member is measured at a temperature of 10°C and a relative humidity of 15% and at a temperature of 32.5°C and a relative humidity of 90%, the following equation establishes:

$\log_{10}\rho_v$ (temperature of 10°C and relative humidity of 15%)- $\log_{10}\rho_v$ (temperature of 32.5°C and relative humidity of 90%) ≤ 2.5 .

26. (Original) The conductive member according to claim 21, having at least one layer formed on a peripheral surface thereof.

27. (Currently Amended) ~~[[The]]~~ An image-forming apparatus comprising ~~[[a]]~~ the conductive member according to claim 1.

28. (Currently Amended) A method of manufacturing a conductive member~~[[,]]~~ having a conductive layer~~[[,]]~~ for use in an image-forming apparatus, comprising the steps of:

kneading or blending a salt ~~capable of dissociating into cations and anions~~ uniformly with a polymer composing an ~~uncontinuous~~ discontinuous polymer phase to which said salt ~~capable of dissociating into cations and anions is unevenly~~ is preferentially distributed to form a compound or a mixture of said salt and said polymer;

adding a polymer composing a continuous polymer phase and a polymer composing ~~another uncontinuous~~ discontinuous polymer phases phase to said compound or said mixture; and kneading a mixture of said all components to form a conductive polymer composition; and

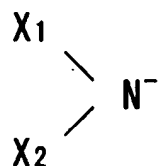
molding or forming said conductive polymer composition by heating said conductive polymer composition into whole or a part of said conductive member for use in an image-forming apparatus.

29. (Currently Amended) A method of manufacturing a belt, ~~for use in an image-forming apparatus, according to claim 21~~~~[[,]]~~ comprising the steps of:

fusing and kneading, by an extruder, a conductive master batch containing a copolymer having a polyether block and 1 to 20 wt% of said an anion-containing salt shown by a chemical formula 1, a flame-retardant additive, and a thermoplastic composition containing not less than 50 wt% of a polyester thermoplastic elastomer to form a mixture; and

extruding said mixture from an annular die and molding said mixture into a shape of a seamless belt by using a sizing die[.]

Chemical Formula 1



Where X_1 and X_2 denote functional group which contains C, F-, and $-SO_2-$ and in which the number of carbon atoms is one to eight,

wherein the belt is the conductive member according to claim 21.

30. (Original) The method of manufacturing a belt according to claim 29, wherein said flame-retardant additive and thermoplastic composition containing said polyester thermoplastic elastomer are kneaded and supplied to said extruder as a flame-retardant master batch; and said mixture of said conductive master batch and said flame-retardant master batch and other components are extruded vertically from said annular die.